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SHELFLIFE AND QUALITY OF GREEN GRAM SPROUTS TREATED WITH DIFFERENT FORMS OF GINGER.

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ABSTRACT

Ginger is the rhizome of Zingiber officinale belonging to the family, Zingiberaceae. It is consumed as a medicine, delicacy and as a spice. In the year 2009-2011, in Department of Agricultural Microbiology, University of Agricultural Sciences, G. K. V. K., Bengaluru, an experiment was conducted to find the effect of ginger (in its past form and ginger pieces form) on the quality and shelf life of green gram sprouts. Experiment results showed that the ginger paste is more effective than ginger pieces.

KEYWORDS: Zingiber Officinale, Green Gram & Ginger Pieces

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Original Article

INTRODUCTION

Green gram is a very nutritious diet, which is consumed in the form of dal and whole dried seeds. Dal is very nutritious and is prepared in the mill, by splitting the seeds. The sprouted mung beans are also found to be highly nutritious. The sprouts are prepared, by soaking the beans overnight. Then, the water is drained and the sprouts are placed in a dark room. Then, the water is sprinkled every few hours after which, the sprouts will be ready in three days. It has been found that, one pound of dry beans gives 6-8 pounds of sprouts. The nutritional value of sprouted beans is higher when compared to their dried embryo. Phasleolus aureus is the botanical name of mung bean and it belongs to the family, 'fabaceae'. Other names are mung, mung bean, golden gram and green gram. These are small, green in color and ovoid in shape. It is the native plant of India and is cultivated since ancient times, but not in a wild state. In India, green gram is one of the most consumed pulses. It has the tendency to flatulence and is free from heaviness. It was introduced early in Indo-China, Southern China, Java and then into the West Indies, Central Africa and the United States.

MATERIAL AND METHODS

In the Department of Agricultural Microbiology, University of Agricultural Sciences, G. K. V. K., and Bengaluru, an experiment was conducted with green gram samples that were collected from various places. These seeds were initially washed multiple times and soaked in water in room temperature for 8 hours. Then, the water was drained out and the seeds were tied in muslin cloth for two days, so that they will sprout.

PREPARATION OF GINGER PASTE

The selected ginger is cleaned by washing the soil particles from it using water. Then, the outer peel is removed and the ginger is cut into small pieces. These pieces were also used for preparing the ginger paste using mortar and pestle under aseptic conditions.

By treating the green gram sprouts with ginger pieces and paste, shelf life of sprouts can be studied, as ginger has anti-microbial properties. Green gram sprouts were treated with ginger initially, after which they are packaged in polythene bag. This bag should be of 200 gauge thickness with minute holes for ventilation. The sealed bags were then incubated at room temperature. These bags were kept on observation and the results were recorded until the green gram sprouts showed some symptoms of spoilage.

RESULTS AND DISCUSSIONS

Effect of Ginger Pieces and Paste Forms Application on Shelflife and Quality of Green Gram Sprouts During Storage

The effect of the application of ginger paste and ginger pieces on the sprouts of green gram was observed, since ginger acts as a bio-preservative against bacteria and fungi spoilage on the shelf life of sprouts. The studied results are shown in the table 1.

After one day of storage, the sprouts that are treated with ginger paste and pieces are found have developed hard texture, odd brown colour, with no odd smell. The untreated sprouts (T_1), turned to semi-hard texture, developed light black colour and odd smell aroused slightly.

After three days of storage, the sprouts that are treated with ginger pieces showed hard texture, light black colour and there was a slight odd smell. The sprouts that were treated with ginger paste became semi hard in texture, developed odd brown color and there was no odd smell. The untreated sprouts (T_1) turned to moderately black smooth texture with odd smell.

Five days after storage, the green gram sprouts that were treated with ginger pieces at all levels turned smooth in texture, moderately black and an odd smell was developed. The sprouts that were treated with all levels of ginger paste turned to soft texture, moderately brown and there was an arousal of slightly odd smell. The untreated sprouts (T_1) got soft texture, turned to complete black and odd smell was observed.

Seven days after storage, the green gram sprouts that were treated with ginger pieces at all levels turned to black completely, became soft in texture and there was a development of odd smell. The sprouts that were treated with all levels of ginger paste turned to soft texture, moderate black and there was an arousal of odd smell. The untreated sprouts (T_1) got soft texture, turned to complete black and foul smell was developed. 5g garlic paste (T_7) is found to be the best treatment of all days. The observation shows that the ginger paste shows better results than the ginger pieces.

Effect of Ginger Piece and Paste on Microbial Population Green Gram Sprouts

To check the effect of ginger paste and pieces on the microbial population of fungi and bacteria of homemade green gram sprouts, an experiment was conducted in various ways. The results are shown in the Table 2.

After the storage, on the first day, green gram sprouts were found to have highest bacterial population in T_1 (39×10^5 cfu/g). This was observed to be on par with T_2, T_3, T_4 and T_5. In T_7, there was an observation of lowest bacterial

population(29×10^5 cfu/g). On the first day, the bacterial and fungal growth was not found.

On the third day of storage, there was an observation of highest fungal growth (10×10^3 cfu/g) in T_1. This is in par withT_2, T_3, T_4 and T_5. In T_7, there was an observation of the lowest fungal population (3×10^3 cfu /g), which was on par with T_4, T_5 and T_6.

On the fifth day, in untreated sprout sample, the highest bacterial population was observed (43×10^5 cfu/g), which was on par with T_2, T_3 and T_4. In T_7, there was an observation of the lowest fungal population (33×10^5 cfu/g).

On the fifth day, in untreated sprout sample, the highest fungal population (14.66×10^3 cfu/g) was observed, which was on par with T_2 and T_3. In T_7, there was an observation of the lowest fungal population (4.66×10^3 cfu/g).

On the seventh day of storage, in T_1 there was an observation of the highest bacterial population (45×10^5 cfu/g), which was on par with T_2, T_3, T_4 and T_5. . In T_7, there was an observation of the lowest population (35×10^5 cfu/g).

The highest fungal population (18.33×10^3 cfu/g) was recorded in the untreated sprout samples, which was on par with T_2 and T_3. The lowest fungal population (8.33×10^3 cfu/g) was found in the green gram sprout sample that was treated with 5g of ginger paste.

Table 1: Effect of Ginger Pieces and Paste Forms on Shelf life and Quality of Green Gram Sprouts During Storage

Treatments	(Storage) days											
	1			3			5			7		
	Colour	Texture	Odour	Colour	Texture	Odour	Colour	Texture	Odour	Colour	Texture	Odour
T1= Control (s)	01.30	01.20	01.50	02.90	02.80	02.85	03.75	03.85	03.60	05.00	04.60	04.80
T2= Sprouts +1 g ginger pieces	01.00	01.10	01.40	02.70	02.65	01.75	03.30	03.80	02.90	04.50	04.65	04.70
T3= Sprouts + 2.5 g ginger pieces	01.00	01.05	01.30	02.60	02.55	01.70	03.25	03.50	02.60	04.50	04.80	04.60
T4= Sprouts + 5.0 g ginger pieces	01.00	01.00	01.25	02.45	02.70	01.65	02.95	03.85	02.30	04.25	04.70	04.30
T5= Sprouts + 1 g ginger paste	01.00	01.15	01.20	02.50	02.85	01.50	02.80	03.90	02.10	03.75	04.80	04.15
T6= Sprouts + 2.5 g ginger paste	01.00	01.60	01.10	02.45	02.90	01.40	02.60	03.85	01.80	03.25	04.90	04.00
T7= Sprouts + 5 g ginger paste	01.00	02.00	01.00	02.20	03.00	01.30	02.30	03.90	01.60	03.10	05.00	03.60

Colour	**Texture**	**Aroma**
1-2 = brown	1-2 = Hard	1-2 = No odd smell
2-3 = Colour turned to light black	2-3 = Semi hard	2-3 = Slightly odd smell

3-4 = Colour turned to moderately black 3-4 = Soft 3-4 = Odd smell

4-5 = Colour turned to complete black 4-5 = Very Soft 4-5 = Foul smell

Table 2: Influence of Ginger Pieces and Paste Forms on Bacterial and Fungal Population of Green Gram Sprouts at Different Intervals During Storage

Treatments	Bacterial population ($\times 10^5$ cfug^{-1})				Fungal population ($\times 10^3$ cfug^{-1})			
	1st	3rd	5th	7th	1st	3rd	5th	7th
T1= Control (s)	-	39.00^{a}	43.00^{a}	45.00^{a}	-	10.00^{a}	14.66^{a}	18.33^{a}
T2= Sprouts +1 g ginger pieces	-	37.00^{ab}	41.66^{a}	43.00^{ab}	-	09.66^{a}	13.33^{ab}	17.00^{a}
T3= Sprouts + 2.5 g ginger pieces	-	35.00^{abc}	39.00^{ab}	42.33^{ab}	-	08.66^{ab}	12.00^{abc}	14.66^{ab}
T4= Sprouts + 5.0 g ginger pieces	-	34.66^{abc}	37.66^{ab}	40.00^{abc}	-	07.00^{abc}	10.66^{bcd}	13.00^{b}
T5= Sprouts + 1 g ginger paste	-	33.00^{abc}	35.00^{b}	38.00^{abc}	-	05.66^{abc}	09.00^{cd}	12.33^{b}
T6= Sprouts + 2.5 g ginger paste	-	31.33^{bc}	34.33^{b}	36.66^{bc}	-	04.33^{bc}	07.33^{de}	11.00^{bc}
T7= Sprouts + 5 g ginger paste	-	29.00^{c}	33.00^{b}	35.00^{c}	-	03.00^{c}	04.66^{e}	08.33^{c}
SEm±	-	01.61	01.38	01.55	-	01.00	00.80	00.90
CD @ 5%	-	04.89	04.18	04.71		03.05	02.44	02.75

Note: Mean values indicates average of 3 replications

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Note: ** Originals not seen*